SCIENCE RESPONSE TO INFORMATION REQUESTS SUBMITTED TO THE ENBRIDGE PIPELINE PROJECT ENVIRONMENTAL IMPACT ASSESSMENT HEARINGS RESPECTING WATER EXTRACTION FOR HYDROSTATIC TESTING

Context

Fisheries and Oceans Canada's (DFO) Environmental Assessment and Major Projects Division (EAMP), Pacific Region, requested that DFO Science, Pacific Region, on May 15, 2012, provide information regarding specific Information Requests (IRs) submitted to the Enbridge Review Panel that DFO Science has the expertise to evaluate. As the IRs for which Science advice was requested cover a range of issues and scientific disciplines, separate Science Responses have been developed for each category of IRs, and in some cases specific IRs. In addition to science related questions, some IRs included elements that were questions pertaining to DFO policy, management or legal information. This Science Response addresses the scientific elements of the following question:

- Is it correct to understand that the EIS description of the scale, timing and location of water extraction (for hydrostatic testing) is insufficient to identify potential effects to fish and fish habitat?

This Science Response report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, Regional Science Special Response Process (SSRP) of May 29th, 2012 on the Science advice in response to information requests submitted by Intervenors to the Enbridge Northern Gateway pipeline project environmental assessment Panel Review Process. Additional publications from this process will be posted as they become available on the Fisheries and Oceans Canada Science Advisory Schedule at www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm.

Background

The Enbridge Northern Gateway Project proposes to ship dilute bitumen from Kitimat, British Columbia to markets in China and California with tankers of the class Very Large Crude Carriers (VLCC) (Vol. 1, B1-2, Enbridge Northern Gateway Project Section 52 Application). Incoming ships will deliver cargoes of condensate. Enbridge Northern Gateway estimate 71 condensate and 149 oil tankers call in at the Kitimat terminal for a total of 440 transits per year (Vol. 8C, B3-37, Enbridge Northern Gateway Project Section 52 Application). A marine terminal will be constructed near Kitimat with two tanker berths and one utility berth (Vol. 1, B1-2, Enbridge Northern Gateway Project Section 52 Application).

There were two IR submissions made to the Joint Review Panel (JRP) by DFO. Enbridge Northern Gateway provided responses to requests for information in the IRs. Since then intervener review of the Environmental Assessment documents prepared by the proponent (Enbridge Northern Gateway) and of the IRs and the responses by the proponent has resulted in a series of further questions to DFO by Interveners.

The integrity of new or existing pipelines can be evaluated by hydrostatic testing. This procedure involves filling a section of pipe with water and then adding additional water to pressurize the pipeline (CAPP 1996). Hydrostatic testing uses locally available water often pumped from streams near the pipeline. The water can be moved along the pipeline and reused. The Enbridge proposal includes a 24" and 36" pipe; according to CAPP (1996) about 900 m^3 of water is required per kilometre of pipeline for testing. CAPP (1996) suggests that as a guideline the amount of water pumped from a stream should not exceed 10% of the instantaneous flow in the stream.

The removal of water from a stream can create a harmful alteration of fish habitat, and impact the ability of fish to migrate up or downstream. However, the EIS provides little specific information on the potential for this activity to impact fish and fish habitat. This document provides guidance for the evaluation of the impact of water removals on fish and fish habitat.

Analysis and Responses

It is generally accepted that the risk to fish and fish habitat increases as more water is removed from a stream for human needs, and those risks are greatest during periods of naturally low flow. However, as flows are naturally very variable, and the responses of biota to changes in flow are unpredictable, there is no simple method to determine when a change to a river's flow regime would cause an impact to fish populations or their habitats.

In a number of jurisdictions water scientists and managers have begun to develop tools to evaluate the relative risks of alterations to natural flows that could occur from water abstraction or diversion. Those methods generally define a proportion of existing flow that could be removed from the channel with a low risk to the stream ecosystem. In the parlance of the *Fisheries Act*, "low risk" could be equated to "unlikely to cause a HADD".

In reviewing a variety of approaches from US and international jurisdictions, Richter et al. (2011) propose that "a high level of ecological protection will be provided when daily flow alterations are not greater than 10%; a high level of protection means that the natural structure and function of the riverine ecosystem will be maintained with minimal changes". A moderate level of protection was considered to be provided for alterations less than 20%, and alterations >20% were considered likely to cause meaningful changes to the ecosystem.

Alberta Environment has developed a method for assessing water removals from streams with largely natural flows (Locke and Paul 2011). The method proposes that water withdrawals in the range of 0-15% of instantaneous flows will maintain full protection of aquatic resources. An important feature of the Alberta method is the establishment of a cut-off flow that prevents water removals during periods of naturally low flows.

A recent DFO Science Advisory meeting on instream flow assessment endorsed the Richter approach (with the provision for cut-off flows). The advisory report for this meeting is in preparation.

Conclusions

The "rule of thumb" proposed by CAPP (1996) of a limit of 10% of instantaneous flow appears to be consistent with recent guidance that suggests that water withdrawals in this range are unlikely to constitute a HADD. Further, water removals for hydrostatic testing are intermittent, and are unlikely to cause impacts comparable to those of continuous removals for industrial or domestic water uses.

In general, water withdrawals during low flow periods should be avoided, particularly in small streams. Water removals in winter can exacerbate harmful ice conditions in smaller systems. Cut-off flows such as those provided by the Alberta method are designed to protect aquatic habitats during low flow periods.

Attempts should also be made to site the intakes to avoid key spawning or nursery areas for fish and to limit the potential for stranding caused by rapid reductions in water level at pump start-up. Guidance for screening should be followed, as indicated in the EIS.

To evaluate the impacts of water withdrawals for hydrostatic testing it is suggested that the proponent:

1. Determine the volume, pumping rate, and prospective pumping sites required for hydrostatic testing
2. Use Water Survey Gauge data or regional hydrology to determine typical monthly flow rates during the months that the proposed pumping sites may be used.
3. Determine if the likely rates of withdrawal from the stream exceed the proposed guidelines as indicated above, and thus may incur a HADD. The potential for fish stranding resulting from rapid decreases in flow should also be considered.

Contributors

Name	Affiliation
Mike Bradford	DFO Science, Pacific Region
Derek Nishimura	Ecosystem Mgmt., Pacific Region
Eva Enders	DFO Science, Central and Arctic Region
Keith Clarke	DFO Science, Nfld and Labrador Region
Linda Nichol (Editor)	DFO Science, Pacific Region
Marilyn Joyce (Editor)	DFO Science, Pacific Region

Approved by

Mark Saunders
Manager, Salmon and Freshwater Ecosystems
DFO Science, Pacific Region
Nanaimo, British Columbia

Sources of information

Canadian Association of Petroleum Producers (CAPP). 1996. Guidelines for hydrostatic test water management. CAPP Publ. 1996-0014, 175pp.

Locke, A. and Paul, A. 2011. A Desk-top Method for Establishing Environmental Flows in Alberta Rivers and Streams. Alberta Environment. ISBN: 978-0-7785-9978-4

Richter, B.D., Davis, M.M., Apse, C. and Konrad, C. 2011. A presumptive standard for environmental flow protection. River Research and Management DOI: 10.1002/rra.1511.

This Report is Available from the:

Centre for Science Advice (CSA)
Pacific Region
Fisheries and Oceans Canada
3190 Hammond Bay Road
Nanaimo, British Columbia
Canada, V9T 6N7

Telephone: 250-756-7208
E-Mail: CSAP@dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas-sccs/

ISSN 1919-3750 (Print)
ISSN 1919-3769 (Online)
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La version française est disponible à l'adresse ci-dessus.

Correct Citation for this Publication:

DFO. 2013. Science response to information requests submitted to the Enbridge pipeline project environmental impact assessment hearings respecting water extraction for hydrostatic testing. DFO Can. Sci. Advis. Sec. Sci. Resp. 2012/026.